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EXAMINER

KAO, CHIH CHENG G

ART UNIT PAPER NUMBER

2882

DATE MAILED: 06/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/775,841

Applicant(s)

SAKUMA ET AL. 

Examiner

Chih-Cheng Glen Kao

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 19 May 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 February 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-4 and 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al. (US Patent 5757995) in view of Kobayashi et al. ("Fluorinated Polyimide Waveguides with Low Polarization-Dependent Loss and their Applications to Thermo-optic Switches"), Yamashita et al. (JP 59-33430), Shani (US Patent 6259834), and Kenney et al. (US Patent 6311004).

2. With regards to claim 1, Chen et al. discloses an optical switch (Fig. 1 and col. 3, lines 65-67) comprising a cladding layer (Fig. 3, #25) and a core in the interior of the cladding (Fig. 1, #22) for light propagating such that a width of the core is enlarged (Fig. 1, #15) to provide plural branched cores (Fig. 1, #13a and 14a).

However, Chen et al. does not disclose altering a propagation path by selective heating of portions of the branching section and plural branched cores, first and second branching section heaters at opposite sides heating different portions of the branching section and at least first and second branched core heaters for heating plural branched cores, the first branching section heater and first branched core heater controlled separately and permitting individual heating conditions, the second branching section heater and second branched core heater controlled separately and

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permitting individual heating conditions, and each branched core heater having distances from the branched core and a portion of the branching section facing the branched core so as not to disturb a light-branching operation.

Kobayashi et al. teaches altering a propagation path by selective heating of portions of the branching section and plural branched cores (Fig. 9a and 9b). Yamashita et al. teaches a branching section heater (Fig. 1, #6) and a first and second branched core heaters (Fig. 1, #7 and 8) for heating the branched core, the branching section heater and first branched core heater controlled separately (Fig. 1, #9) and permitting individual heating conditions (Figs. 1-3), the branching section heater and the second branched core heater controlled separately (Fig. 1, #9) and permitting individual heating conditions (Figs. 1-3). Shani teaches first and second branching section heaters for heating plural branched cores (Fig. 7, #46 and 48). Kenney et al. teaches branch heater a distance from the branched core and branching section so as not to disturb a light-branching operation (Fig. 5, #506).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to alter a propagation path by selective heating portions of the branch and cores of Kobayashi et al. with the device of Chen et al., since one would be motivated to do this in a switch for fast switching speeds (Page 1028, col. 1, last 3 lines) as implied from Kobayashi et al.

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have the branching section heater, branched core heaters, and separate control for individual heating conditions of Yamashita et al. with the suggested device of Chen et al. in view of Kobayashi et al., since one would be motivated to use this in a switch to attain a

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high extinction ratio, by providing heating electrodes independent from each other as shown by Yamashita et al. (Abstract, Purpose).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have the first and second branching section heaters for heating plural branched cores of Shani with the suggested device of Chen et al. in view of Kobayashi et al. and Yamashita et al., since one would be motivated to use this to direct light in a certain direction as implied from Shani (col. 2, lines 24-26).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have the branch heaters of Kenny et al. with the suggested device of Chen et al. in view of Kobayashi et al., Yamashita et al., and Shani, since one would be motivated to use them in a small but critical region to keep the device compact as implied from Kenney et al. (col. 7, lines 20-30).

3. With regards to claims 2 and 3, Chen et al. in view of Kobayashi et al., Yamashita et al., Shani, and Kenney et al. suggests a device as recited above.

However, Chen et al. does not disclose a set of separate heaters for the branching section heater and branched core heater.

Yamashita et al. teaches a set of separate heaters for the branching section heater and branched core heater (Fig. 1, #7-9)

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have a set of heaters of Yamashita et al. with the suggested device of Chen et al. in view of Kobayashi et al., Yamashita et al., Shani, and Kenney et al., since one

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would be motivated to use this in a switch to attain a high extinction ratio, by providing heating electrodes independent from each other as shown by Yamashita et al. (Abstract, Purpose).

4. With regards to claim 4, Chen et al. in view of Kobayashi et al., Yamashita et al., Shani, and Kenney et al. suggests a device as recited above.

However, Chen et al. does not disclose a unitized heater.

Kobayashi et al. teaches a unitized heater (Fig. 9a, "Heater 1" and "Heater 2").

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have unitized heaters of Kobayashi et al. with the suggested device of Chen et al. in view of Kobayashi et al., Yamashita et al., Shani, and Kenney et al., since one would be motivated to use this to alter the refractive indices of the waveguide to change the direction of light propagation (Figs. 9a and 9b) as implied from Kobayashi et al. Secondly, constructing in one piece an object which has been formerly been constructed in two pieces and put together involves only routine skill in the art. One would be motivated to created a unitized or integral structure to create less manufacturing steps to reduce time in manufacturing.

5. With regards to claim 6, Chen et al. further discloses the core as y-shaped having two branched cores (Fig. 1).

6. With regards to claim 7, Chen et al. in view of Kobayashi et al., Yamashita et al., Shani, and Kenney et al. suggests a device as recited above.

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However, Chen et al. does not disclose either the core or cladding comprised of polymeric material.

Kobayashi et al. teaches either the core or cladding comprised of polymeric material (Title).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have the polymeric material of Kobayashi et al. with the suggested device of Chen et al. in view of Kobayashi et al., Yamashita et al., Shani, and Kenney et al., since one would be motivated to use this for its low losses and fast switching speeds in optical switches (Abstract) as implied from Kobayashi et al. Secondly, it would have been within general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

7. With regards to claim 8, Chen et al. in view of Kobayashi et al., Yamashita et al., Shani, and Kenney et al. suggests a device as recited above.

However, Chen et al. does not disclose heaters of electrically conductive thin film above the cladding layer.

Kobayashi et al. teaches heaters of electrically conductive thin film (Page 1025, col. 2, 2<sup>nd</sup> paragraph). Kenney et al. teaches heaters above the cladding layer (Fig. 5, #506).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have the thin film of Kobayashi et al. with the suggested device of Chen et al. in view of Kobayashi et al., Yamashita et al., Shani, and Kenney et al., since one would be motivated to use this for being able to direct light to a different direction (Fig. 9a and 9b) as

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implied from Kobayashi et al. Secondly, it would have been within general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have the heaters above the cladding of Kenney et al. with the suggested device of Chen et al. in view of Kobayashi et al., Yamashita et al., Shani, and Kenney et al., since one would be motivated to have the heaters there in order to perform there thermo-optic functions (col. 8, lines 45-50) as implied from Kobayashi et al. Secondly, rearranging part of an invention involves only routine skill in the art.

8. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al. in view of Kobayashi et al., Yamashita et al., Shani, and Kenny et al. as applied to claim 1 above, and further in view of Cohen et al. (US Patent 5418868).

Chen et al. in view of Kobayashi et al., Yamashita et al., Shani, and Kenney et al. suggest a device as recited above.

However, Chen et al. does not seem to specifically disclose a minimum distance of 40 um or more from a branching core heater and a center of the core adjacent.

Cohen et al. teaches a minimum distance of 40 um or more from a branching core heater (Fig. 1, #120) and a center of the core adjacent (Fig. 1, #115) and a branching section (Fig. 1, #20).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have the distance of Cohen et al. with the suggested device of Chen et al.



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in view of Kobayashi et al., Yamashita et al., Shani, and Kenney et al., since one may be motivated to affect only one part of the waveguide system when making the change as needed in Cohen et al. (col. 5, lines 60-69). Secondly, discovering an optimum or workable range, where the general conditions of a claim are disclosed in the prior art, involves only routine skill in the art. Lastly, rearranging part of an invention only involves routine skill in the art.

9. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al. in view of Kobayashi et al., Yamashita et al., Shani, and Kenney et al. as applied to claim 1 above, and further in view of Ooba et al. ("Low crosstalk and low loss 1x8 digital optical switch using silicone resin waveguides").

Chen et al. in view of Kobayashi et al., Yamashita et al., Shani, and Kenney et al. suggest a device as recited above.

However, Chen et al. does not seem to specifically disclose combining in plural optical switches.

Ooba et al. teaches combining in plural optical switches (Fig. 1).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have the plural optical switches of Ooba et al. with the suggested device of Chen et al. in view of Kobayashi et al., Yamashita et al., Shani, and Kenney et al., since one may be motivated to send one signal to multiple locations as seen in Fig. 1. Secondly, the combining of plural optical switches is conventional and a plurality of combinations can be created as shown by Ooba et al. (Page 1364, top of col. 2). It would have just been a matter of

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engineering efficiency to combine plural switches together based on the communication system one may want to set up. This is within routine skill to one having ordinary skill in the art.

### *Response to Arguments*

10. Applicant's arguments with respect to claims 1-9 have been considered but are moot in view of the new ground(s) of rejection.

With regards to Yamashita et al., the heaters (Fig. 1, #7-9) "are located away from each other". Secondly, the distance between the heaters is also more than 40 um as seen in the figure.

With regards to Kenney et al., does suggest the heaters located away from the core, since the heaters are located on a "coat" such as an upper cladding, which creates a distance away from the core.

With regards to Cohen et al., the claim recites 40 um or more. Therefore, 100's or 1000's of um in conventional art would read upon the claim.

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chih-Cheng Glen Kao whose telephone number is (703) 605-5298. The examiner can normally be reached on M - Th (8 am to 5 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (703) 305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



gk

June 10, 2003



DAVID V. BRUCE  
PRIMARY EXAMINER